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NATA

LumCAT: 3-1545-A3
Luminaire: 99.02.73.172+92.76.365.00
Report No: NATA0100
Test No: GC2018111509
LampCAT: OSRAM SOLERIQ S15
Lamp flux(lm): 2616.0
Number of Lamps: 1
Length(mm): 84
Phm Type: C

Voltage(V): 36.3000
Current(A): 0.5600
Power (W): 20.3280
PF: 0.0000
Ballast type: DC
Width(mm): 84
Height(mm): 0

Photometric Results

Lumens(lm): 2408.71
Efficiency(%): 92.08%
Lumens(lm)/Power(W): 118.76
Central intensity(cd): 23246.720
Maximum intensity(cd): 23246.720
Angle of maximum intensity: C=0.0 γ =0.0
Beam Angle(50%Imax): [C0/180]Total=12.9
 [C90/270]Total=12.9
Field angle(10%Imax): [C0/180]Total=25.6
 [C90/270]Total=25.6
Maximum s/h(1/2): C0_180=0.22 C90_270=0.22
Maximum s/h(1/4): C0_180=0.22 C90_270=0.22
Up flux rate of lamp(%): 0.00%
Down flux rate of lamp(%): 92.28%
Up flux rate of LUM(%): - -
Down flux rate of LUM(%): 100.00%
CIE Type : Direct lighting
Output flux ratio in π solid angle : 98.519%

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
0.0	23246.719	5.562	5.562	.213%	.231%
1.0	23006.953	44.032	49.593	1.683%	2.059%
2.0	22138.594	84.727	134.32	3.239%	5.576%
3.0	20573.438	118.075	252.395	4.514%	10.478%
4.0	18473.203	141.312	393.707	5.402%	16.345%
5.0	15632.367	149.408	543.115	5.711%	22.548%
6.0	13076.719	149.894	693.009	5.730%	28.771%
7.0	9845.016	131.572	824.581	5.030%	34.233%
8.0	7932.164	121.059	945.64	4.628%	39.259%
9.0	5926.078	101.660	1047.301	3.886%	43.480%
10.0	4384.406	83.490	1130.79	3.192%	46.946%
11.0	3503.531	73.309	1204.099	2.802%	49.989%
12.0	2739.094	62.451	1266.55	2.387%	52.582%
13.0	2221.734	54.806	1321.356	2.095%	54.858%
14.0	1879.313	49.857	1371.213	1.906%	56.927%
15.0	1648.336	46.784	1417.997	1.788%	58.870%
16.0	1470.727	44.455	1462.452	1.699%	60.715%
17.0	1344.516	43.108	1505.56	1.648%	62.505%
18.0	1250.079	42.362	1547.921	1.619%	64.264%
19.0	1183.113	42.240	1590.161	1.615%	66.017%
20.0	1122.152	42.088	1632.248	1.609%	67.765%
21.0	1081.610	42.506	1674.755	1.625%	69.529%
22.0	1046.686	42.998	1717.752	1.644%	71.314%
23.0	1014.103	43.452	1761.204	1.661%	73.118%
24.0	985.809	43.970	1805.174	1.681%	74.944%
25.0	958.155	44.405	1849.58	1.697%	76.787%
26.0	933.370	44.869	1894.449	1.715%	78.650%
27.0	910.259	45.317	1939.766	1.732%	80.531%
28.0	887.604	45.696	1985.462	1.747%	82.429%
29.0	867.523	46.122	2031.584	1.763%	84.343%
30.0	848.320	46.514	2078.098	1.778%	86.274%
31.0	817.678	46.182	2124.28	1.765%	88.192%
32.0	766.378	44.535	2168.815	1.702%	90.041%
33.0	704.911	42.101	2210.916	1.609%	91.789%
34.0	615.108	37.719	2248.636	1.442%	93.355%
35.0	512.606	32.242	2280.878	1.233%	94.693%
36.0	404.747	26.089	2306.967	.997%	95.776%
37.0	298.519	19.701	2326.668	.753%	96.594%

$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
38.0	197.965	13.365	2340.033	.511%	97.149%
39.0	135.879	9.377	2349.41	.358%	97.538%
40.0	70.587	4.976	2354.386	.190%	97.745%
41.0	39.424	2.836	2357.222	.108%	97.863%
42.0	27.844	2.043	2359.265	.078%	97.947%
43.0	22.795	1.705	2360.97	.065%	98.018%
44.0	17.641	1.344	2362.314	.051%	98.074%
45.0	15.307	1.187	2363.501	.045%	98.123%
46.0	13.584	1.072	2364.573	.041%	98.168%
47.0	12.516	1.004	2365.576	.038%	98.209%
48.0	12.241	0.998	2366.574	.038%	98.251%
49.0	12.023	0.995	2367.569	.038%	98.292%
50.0	11.770	0.989	2368.558	.038%	98.333%
51.0	11.595	0.988	2369.546	.038%	98.374%
52.0	11.412	0.986	2370.532	.038%	98.415%
53.0	11.243	0.985	2371.517	.038%	98.456%
54.0	11.095	0.984	2372.501	.038%	98.497%
55.0	10.941	0.983	2373.484	.038%	98.538%
56.0	10.828	0.984	2374.468	.038%	98.579%
57.0	10.709	0.985	2375.453	.038%	98.619%
58.0	10.575	0.983	2376.437	.038%	98.660%
59.0	10.484	0.985	2377.422	.038%	98.701%
60.0	10.413	0.989	2378.411	.038%	98.742%
61.0	10.329	0.991	2379.402	.038%	98.783%
62.0	10.238	0.991	2380.393	.038%	98.825%
63.0	10.181	0.995	2381.388	.038%	98.866%
64.0	10.125	0.998	2382.386	.038%	98.907%
65.0	10.055	0.999	2383.385	.038%	98.949%
66.0	10.013	1.003	2384.388	.038%	98.990%
67.0	9.963	1.006	2385.394	.038%	99.032%
68.0	9.907	1.007	2386.401	.039%	99.074%
69.0	9.872	1.011	2387.412	.039%	99.116%
70.0	9.858	1.016	2388.428	.039%	99.158%
71.0	9.809	1.017	2389.445	.039%	99.200%
72.0	9.788	1.021	2390.465	.039%	99.243%
73.0	9.780	1.026	2391.491	.039%	99.285%
74.0	9.759	1.029	2392.52	.039%	99.328%
75.0	9.731	1.031	2393.551	.039%	99.371%

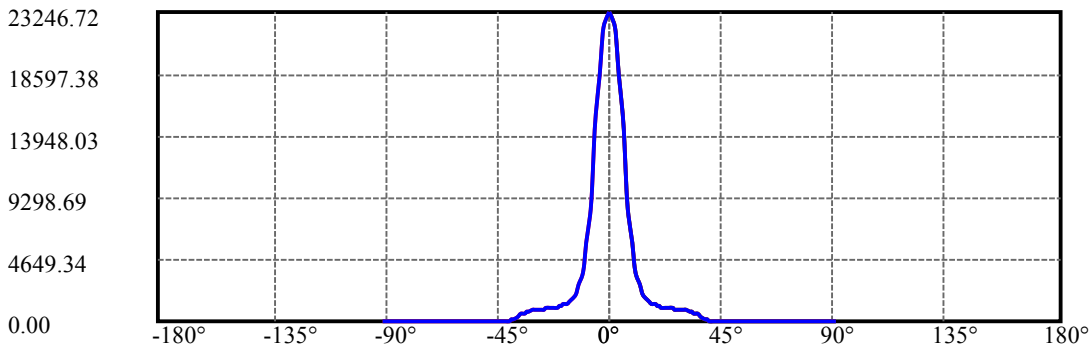
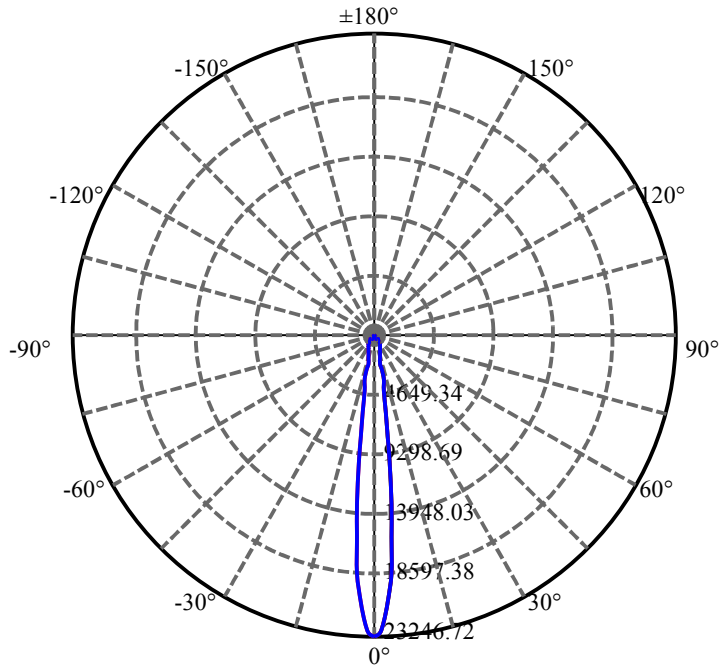
$\gamma(^{\circ})$	Average I(cd)	Zonal F(lm)	Sum F(lm)	Eff Flux(%)	Eff Sum(%)
76.0	9.724	1.035	2394.585	.040%	99.414%
77.0	9.696	1.036	2395.621	.040%	99.457%
78.0	9.689	1.039	2396.661	.040%	99.500%
79.0	9.675	1.041	2397.702	.040%	99.543%
80.0	9.647	1.042	2398.744	.040%	99.586%
81.0	9.640	1.044	2399.788	.040%	99.630%
82.0	9.640	1.047	2400.835	.040%	99.673%
83.0	9.640	1.049	2401.884	.040%	99.717%
84.0	9.626	1.050	2402.934	.040%	99.760%
85.0	9.633	1.052	2403.986	.040%	99.804%
86.0	9.612	1.051	2405.038	.040%	99.848%
87.0	9.598	1.051	2406.089	.040%	99.891%
88.0	9.563	1.048	2407.137	.040%	99.935%
89.0	9.541	1.046	2408.183	.040%	99.978%
90.0	9.541	0.523	2408.706	.020%	100.000%

ZONAL LUMEN SUMMARY

Zone	Lumens	%Lamp	%Fixt
0-30	2078.10	79.44%	86.27%
0-40	2354.39	90.00%	97.74%
0-60	2378.41	90.92%	98.74%
0-90	2408.18	92.06%	99.98%
0-120	2408.18	92.06%	99.98%
0-180	2408.71	92.08%	100.00%
60-90	30.76	1.18%	1.28%
90-120	0.00	0.00%	0.00%
90-130	0.00	0.00%	0.00%
90-150	0.00	0.00%	0.00%
90-180	0.00	0.00%	0.00%
0-26.72	1926.97	73.66%	80.00%

ZONAL LUMEN SUMMARY

0-10	1130.79
10-20	501.46
20-30	445.85
30-40	276.29
40-50	14.17
50-60	9.85
60-70	10.02
70-80	10.32
80-90	9.44
90-100	0.00
100-110	0.00
110-120	0.00
120-130	0.00
130-140	0.00
140-150	0.00
150-160	0.00
160-170	0.00
170-180	0.00



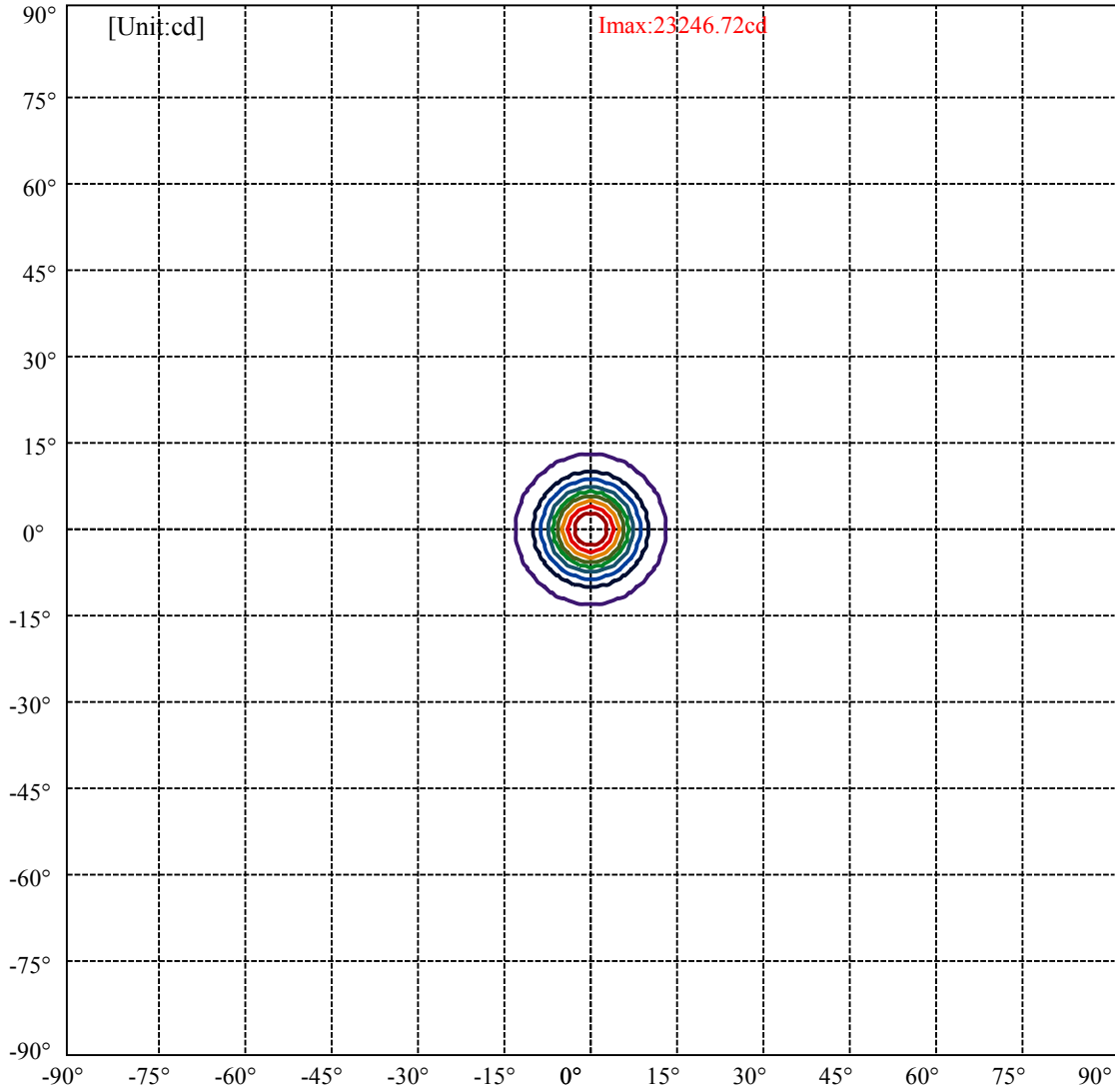
C0(Max): —————

C0/C180: —————

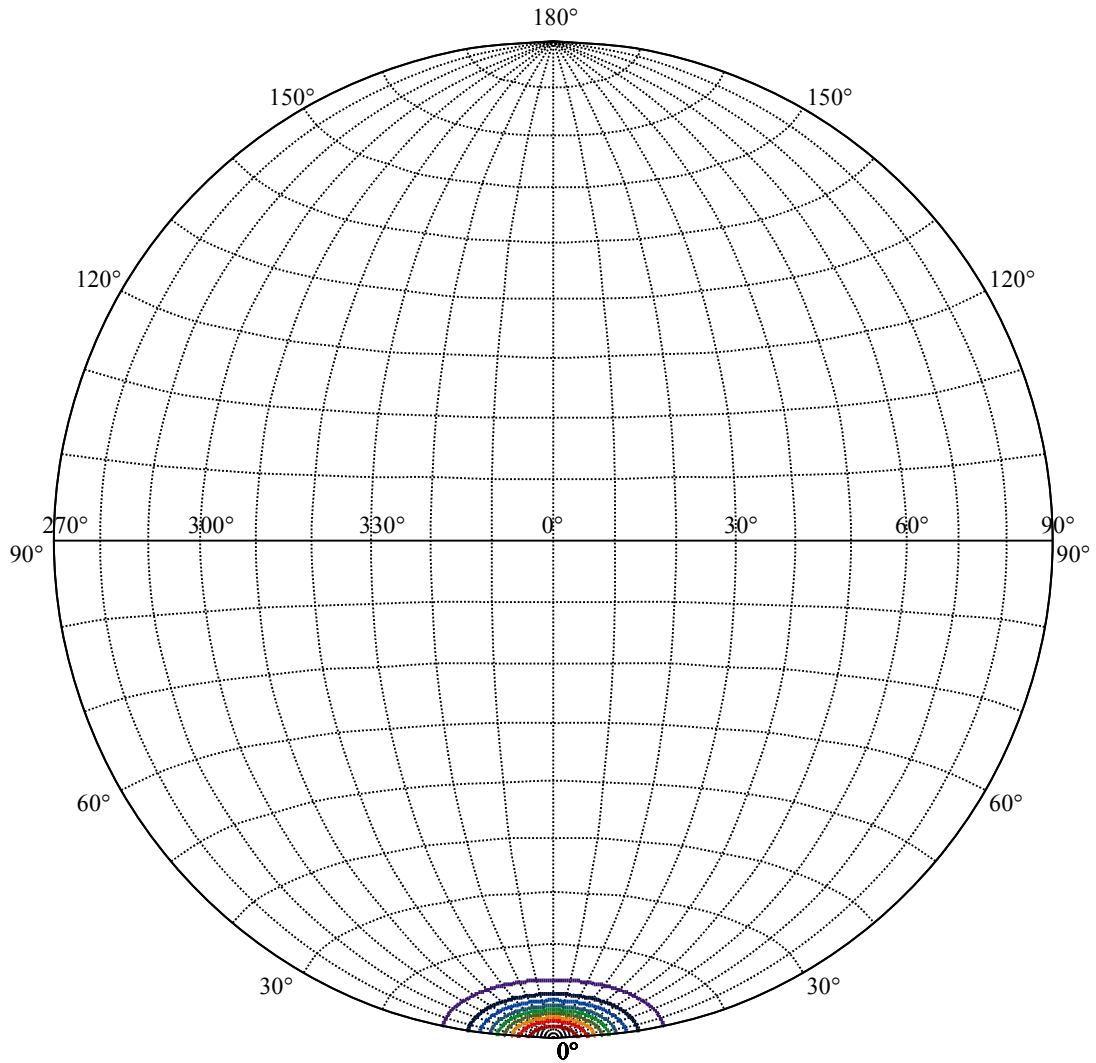
C90/C270: —————

Field angle(10%Imax):C0/180Left:12.8 Right:12.8
:C90/270Left:12.8 Right:12.8

Beam Angle(50%Imax):C0/180Left:6.4 Right:6.4
:C90/270Left:6.4 Right:6.4



(10%Imax) 2324.67	—
(20%Imax) 4649.34	—
(30%Imax) 6974.02	—
(40%Imax) 9298.69	—
(50%Imax) 11623.4	—
(60%Imax) 13948	—
(70%Imax) 16272.7	—
(80%Imax) 18597.4	—
(90%Imax) 20922	—



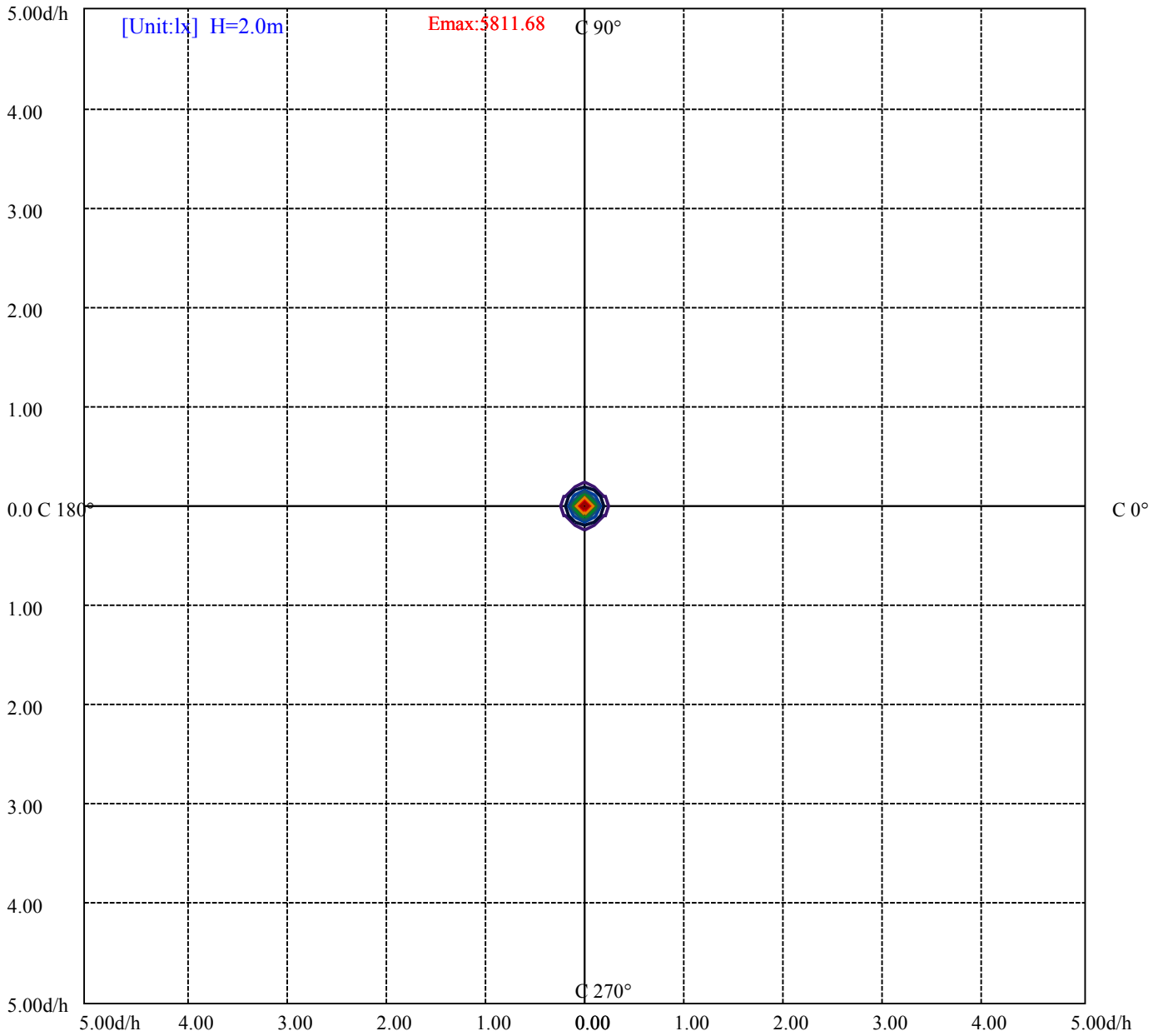
House

[Unit:cd]

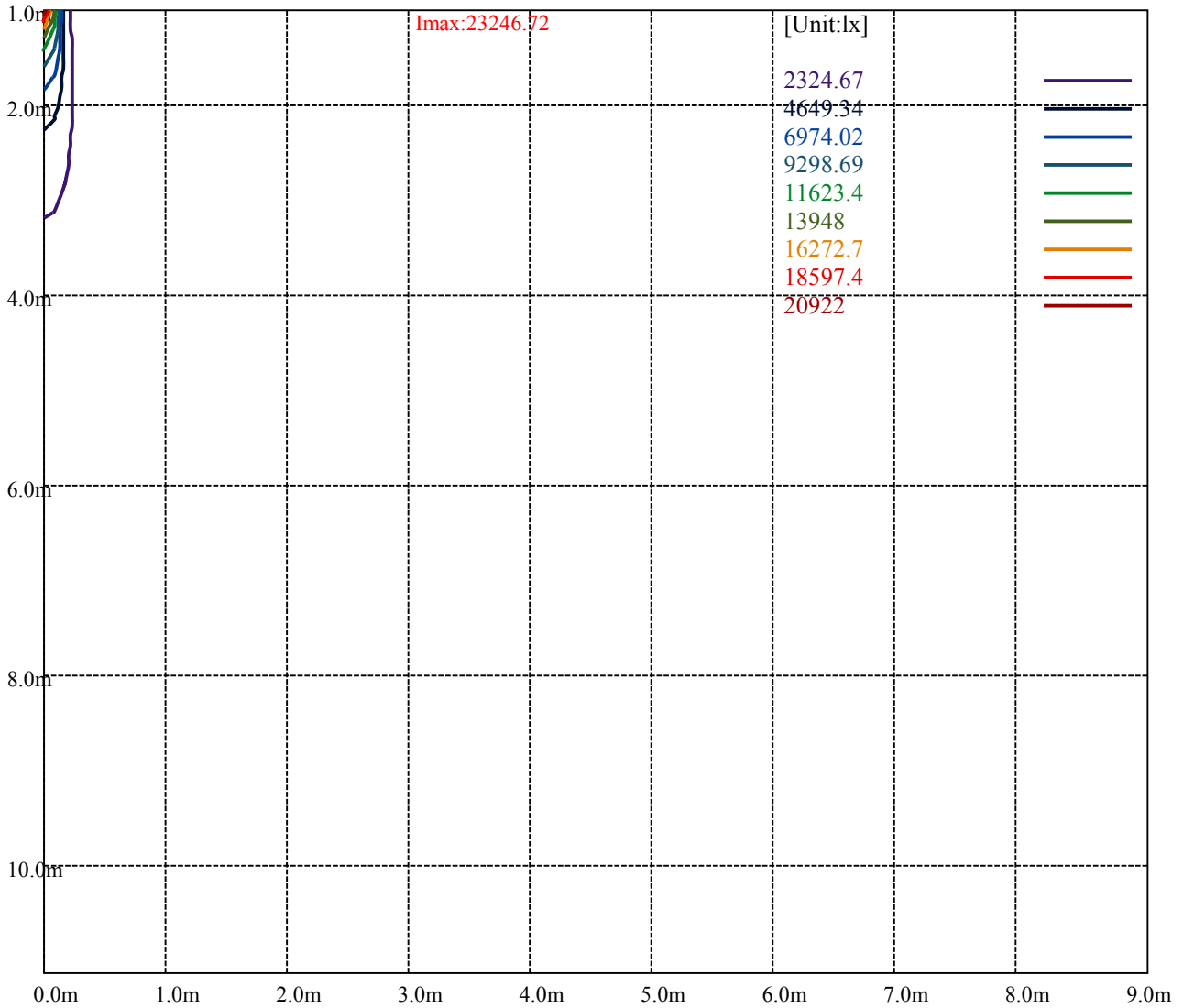
Road

Imax:23246.72

(10%Imax) 2324.67	—
(20%Imax) 4649.34	—
(30%Imax) 6974.02	—
(40%Imax) 9298.69	—
(50%Imax) 11623.4	—
(60%Imax) 13948	—
(70%Imax) 16272.7	—
(80%Imax) 18597.4	—
(90%Imax) 20922	—



(10%Emax) 581.1675	—
(20%Emax) 1162.335	—
(30%Emax) 1743.5	—
(40%Emax) 2324.667	—
(50%Emax) 2905.825	—
(60%Emax) 3487	—
(70%Emax) 4068.175	—
(80%Emax) 4649.325	—
(90%Emax) 5230.5	—



Luminance Table

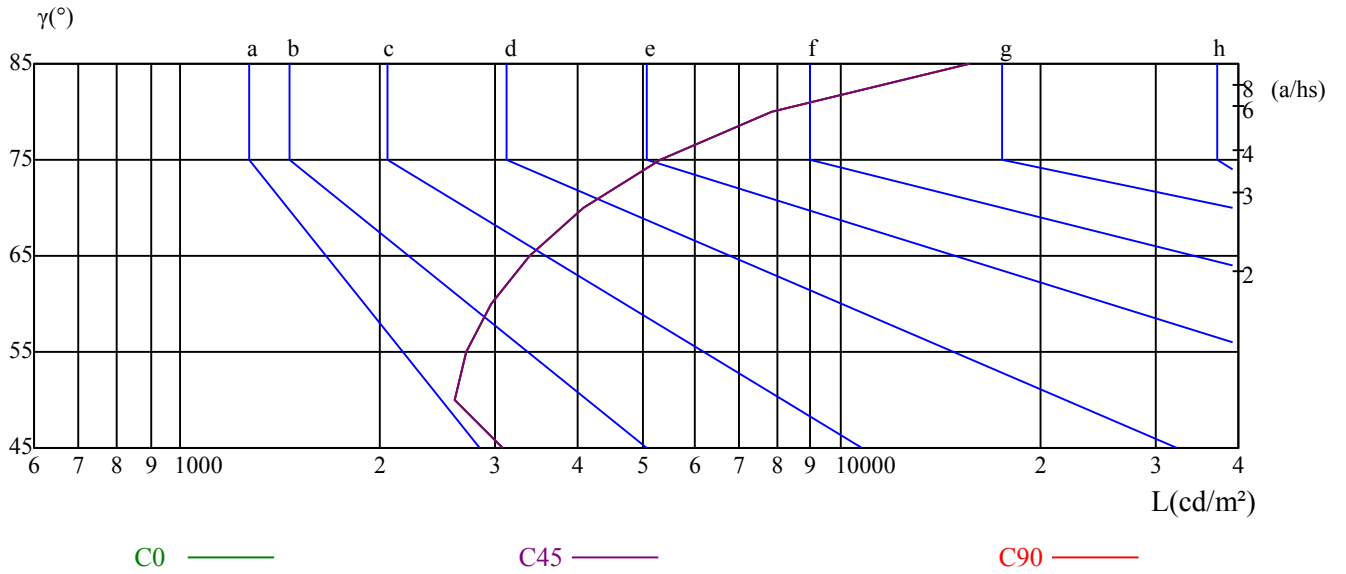
γ	45	50	55	60	65	70	75	80	85
C0	3068	2595	2703	2952	3372	4085	5329	7873	15664
C45	3068	2595	2703	2952	3372	4085	5329	7873	15664
C90	3068	2595	2703	2952	3372	4085	5329	7873	15664

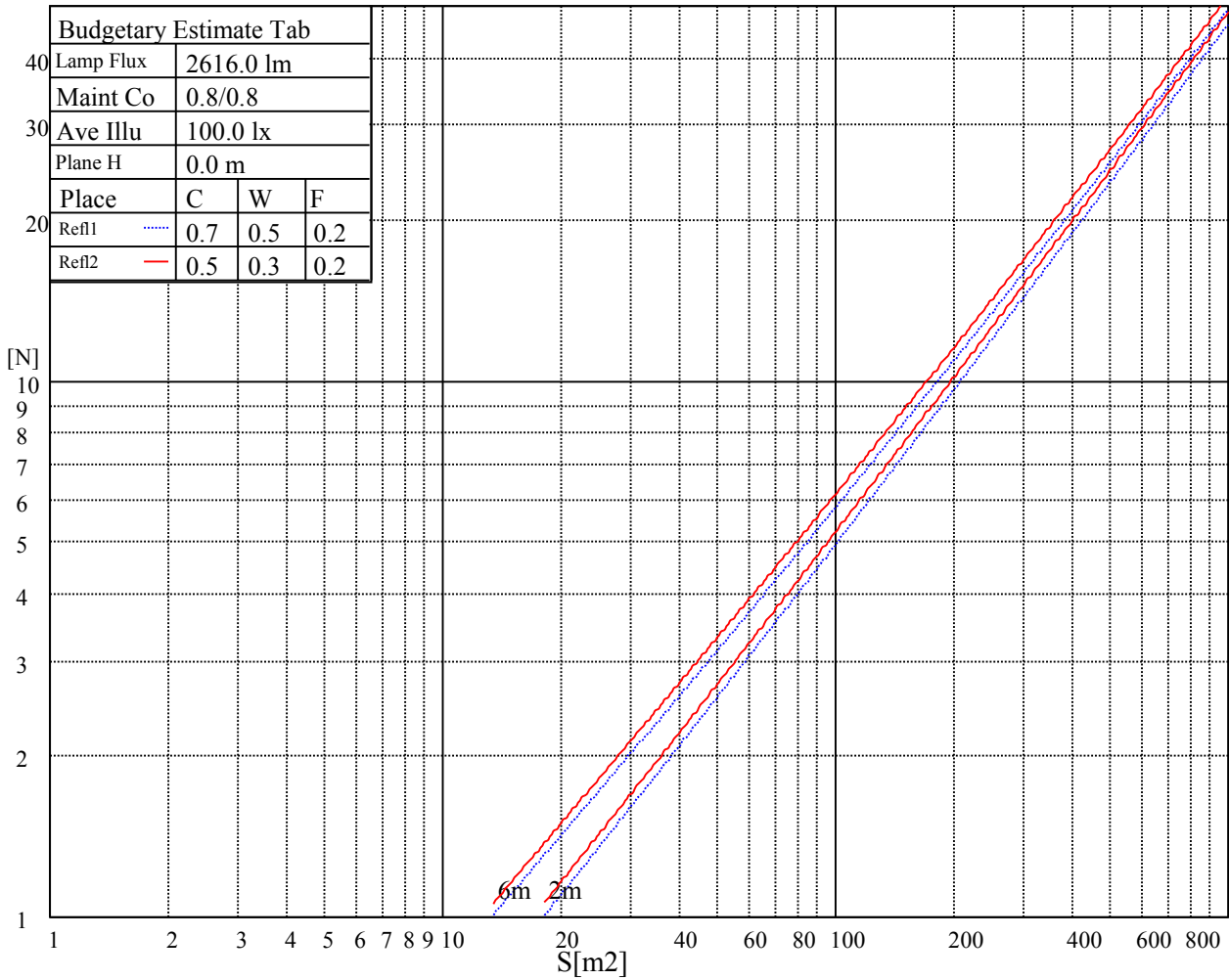
L(Hor)(65)	L(Ver)(65)	L45(65)	L(Hor)(75)	L(Ver)(75)	L45(75)	L(Hor)(85)	L(Ver)(85)	L45(85)
3372	3372	3372	5329	5329	5329	15664	15664	15664

Glare Table

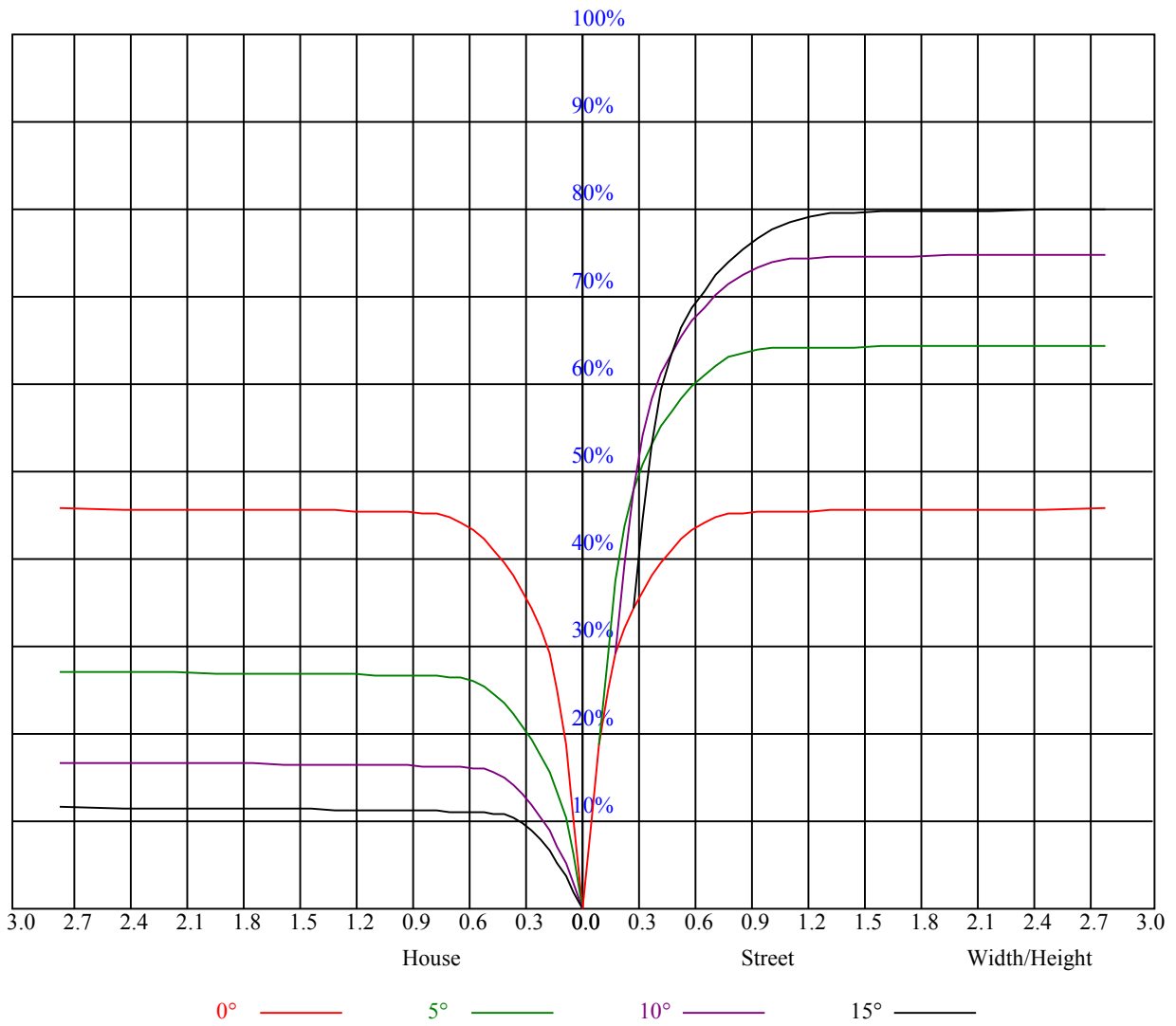
Glare	Quality	Service Values Illuminance(lx)							
1.15	A	2000	1000	500	<=300				
1.5	B		2000	1000	500	<=300			
1.85	C			2000	1000	500	<=300		
2.2	D				2000	1000	500	<=300	
2.55	E					2000	1000	500	<=300
		a	b	c	d	e	f	g	h

Luminance Limiting Curve





RHOCC	80			70			50			30			10			0
RHOW	50	30	10	50	30	10	50	30	10	50	30	10	50	30	10	0
RCR	COEFFICIENTS OF UTILIZATION RHOFC=20 CU															
0	1.10	1.10	1.10	1.07	1.07	1.07	1.03	1.03	1.03	0.98	0.98	0.98	0.94	0.94	0.94	0.92
1	1.04	1.02	1.00	1.02	1.00	0.98	0.98	0.96	0.95	0.94	0.93	0.92	0.91	0.91	0.90	0.88
2	0.98	0.95	0.93	0.97	0.94	0.92	0.94	0.92	0.90	0.91	0.90	0.88	0.89	0.87	0.86	0.85
3	0.94	0.90	0.88	0.93	0.90	0.87	0.90	0.88	0.86	0.88	0.86	0.84	0.86	0.85	0.83	0.82
4	0.90	0.86	0.83	0.89	0.86	0.83	0.87	0.84	0.82	0.86	0.83	0.81	0.84	0.82	0.80	0.79
5	0.87	0.83	0.80	0.86	0.82	0.80	0.84	0.81	0.79	0.83	0.80	0.78	0.82	0.79	0.78	0.77
6	0.84	0.80	0.77	0.83	0.79	0.77	0.82	0.79	0.76	0.81	0.78	0.76	0.80	0.77	0.75	0.74
7	0.81	0.77	0.74	0.81	0.77	0.74	0.79	0.76	0.74	0.79	0.76	0.73	0.78	0.75	0.73	0.72
8	0.79	0.75	0.72	0.78	0.74	0.72	0.77	0.74	0.72	0.76	0.73	0.71	0.76	0.73	0.71	0.70
9	0.76	0.73	0.70	0.76	0.72	0.70	0.75	0.72	0.70	0.75	0.72	0.69	0.74	0.71	0.69	0.68
10	0.74	0.71	0.68	0.74	0.70	0.68	0.73	0.70	0.68	0.73	0.70	0.68	0.72	0.69	0.68	0.67



Intensity data(cd)

C/γ(°)	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0
0.0	23090.63	23551.88	23416.88	22809.38	21487.50	19282.50	16796.25	13708.13	11002.50
45.0	23439.38	22770.00	21391.88	19743.75	16751.25	14011.88	11216.25	8055.00	6069.38
90.0	23062.50	22140.00	20542.50	17707.50	15052.50	11143.69	9124.31	6583.50	4920.75
135.0	23394.38	22691.25	21223.13	19203.75	16402.50	13258.13	10456.88	7661.25	5731.88
180.0	23090.63	22218.75	20671.88	17887.50	15243.75	10983.38	9303.19	6740.44	5040.00
225.0	23439.38	23557.50	23175.00	22100.63	20480.63	18286.88	14979.38	11152.13	9522.56
270.0	23062.50	23529.38	23422.50	22871.25	21611.25	19445.63	16976.25	13905.00	11188.13
315.0	23394.38	23596.88	23265.00	22263.75	20756.25	18646.88	15761.25	10954.69	9982.13
360.0	23090.63	23551.88	23416.88	22809.38	21487.50	19282.50	16796.25	13708.13	11002.50
C/γ(°)	9.0	10.0	11.0	12.0	13.0	14.0	15.0	16.0	17.0
0.0	8229.38	6058.13	4657.50	3645.00	2846.25	2314.13	1977.75	1708.88	1521.56
45.0	4595.63	3352.50	2908.13	2225.81	1833.19	1622.81	1474.31	1352.81	1251.00
90.0	3640.50	2796.19	2294.44	1908.00	1671.19	1486.13	1347.75	1253.25	1184.63
135.0	4179.38	3150.00	2885.63	2110.50	1776.38	1550.25	1405.13	1287.00	1205.44
180.0	3718.13	2930.06	2326.50	1931.63	1694.25	1508.06	1371.38	1276.31	1201.50
225.0	7243.88	5127.75	3948.75	3110.63	2402.44	2030.06	1764.56	1553.63	1401.75
270.0	8398.13	6198.75	4775.63	3729.38	2902.50	2346.19	1994.63	1692.00	1522.13
315.0	7403.63	5461.88	4231.69	3251.81	2647.69	2176.88	1851.19	1641.94	1468.13
360.0	8229.38	6058.13	4657.50	3645.00	2846.25	2314.13	1977.75	1708.88	1521.56
C/γ(°)	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0
0.0	1398.94	1304.44	1215.00	1162.13	1122.19	1083.38	1054.13	1024.88	989.44
45.0	1176.75	1117.13	1074.38	1044.56	1013.63	986.63	957.38	931.50	910.69
90.0	1122.30	1088.78	1058.18	1023.47	987.24	958.28	933.02	907.14	889.54
135.0	1157.06	1119.94	1077.19	1044.56	1017.00	979.88	956.25	936.00	908.44
180.0	1120.89	1099.63	1069.03	1026.45	998.33	965.64	934.03	909.11	889.82
225.0	1294.88	1206.56	1120.95	1096.09	1061.21	1034.78	1004.40	973.63	948.94
270.0	1394.44	1285.88	1201.50	1147.50	1100.81	1064.81	1037.25	1004.63	974.81
315.0	1335.38	1242.56	1161.00	1108.13	1073.08	1039.44	1010.03	978.36	955.29
360.0	1398.94	1304.44	1215.00	1162.13	1122.19	1083.38	1054.13	1024.88	989.44
C/γ(°)	27.0	28.0	29.0	30.0	31.0	32.0	33.0	34.0	35.0
0.0	955.69	930.38	907.31	886.50	866.25	847.13	827.44	773.44	675.00
45.0	893.81	867.94	849.94	833.06	800.44	738.00	656.44	546.75	420.19
90.0	872.61	850.89	831.32	813.94	769.22	672.41	574.88	461.59	361.46
135.0	885.94	866.81	843.75	825.75	785.81	705.38	615.38	497.81	377.44
180.0	869.01	850.22	830.70	809.66	766.74	668.87	557.78	455.40	354.26
225.0	927.00	903.26	884.25	864.79	842.34	823.89	783.34	694.52	596.08
270.0	943.31	917.44	898.88	879.75	857.25	840.94	821.81	761.06	672.75
315.0	934.71	913.89	894.04	873.11	853.37	834.41	802.24	730.29	643.67
360.0	955.69	930.38	907.31	886.50	866.25	847.13	827.44	773.44	675.00
C/γ(°)	36.0	37.0	38.0	39.0	40.0	41.0	42.0	43.0	44.0
0.0	577.13	473.06	354.38	287.44	135.23	59.96	36.96	32.06	25.48
45.0	308.81	235.97	118.01	57.21	37.35	32.68	26.72	22.73	17.44
90.0	249.53	144.45	70.37	39.60	32.29	26.89	22.67	18.84	13.05
135.0	285.75	177.08	85.61	45.96	33.36	27.39	21.94	19.18	14.74
180.0	230.91	140.18	67.73	35.38	29.70	23.51	19.58	16.65	13.05
225.0	485.49	343.35	251.49	147.32	65.81	39.21	30.38	21.60	18.17
270.0	574.31	471.38	339.75	286.31	133.65	57.21	32.40	26.61	19.74
315.0	526.05	402.69	296.38	187.82	97.31	48.54	32.12	24.69	19.46
360.0	577.13	473.06	354.38	287.44	135.23	59.96	36.96	32.06	25.48

Intensity data(cd)

C/γ(°)	45.0	46.0	47.0	48.0	49.0	50.0	51.0	52.0	53.0
0.0	21.88	17.61	13.11	12.77	12.49	12.15	11.98	11.76	11.59
45.0	12.88	12.54	12.26	12.04	11.87	11.59	11.48	11.31	11.14
90.0	12.60	12.32	12.04	11.81	11.64	11.48	11.25	11.08	10.97
135.0	12.66	12.38	12.15	11.98	11.76	11.53	11.42	11.25	11.08
180.0	12.71	12.49	12.15	11.93	11.76	11.59	11.42	11.25	11.08
225.0	15.98	12.94	12.66	12.26	12.04	11.87	11.64	11.42	11.25
270.0	16.71	14.74	12.88	12.54	12.26	11.98	11.81	11.64	11.42
315.0	17.04	13.67	12.88	12.60	12.38	11.98	11.76	11.59	11.42
360.0	21.88	17.61	13.11	12.77	12.49	12.15	11.98	11.76	11.59
C/γ(°)	54.0	55.0	56.0	57.0	58.0	59.0	60.0	61.0	62.0
0.0	11.42	11.25	11.08	10.97	10.80	10.69	10.63	10.52	10.41
45.0	10.97	10.86	10.74	10.63	10.46	10.41	10.35	10.29	10.18
90.0	10.86	10.69	10.63	10.52	10.35	10.29	10.24	10.18	10.07
135.0	10.97	10.80	10.69	10.58	10.52	10.41	10.35	10.29	10.18
180.0	10.97	10.80	10.69	10.58	10.46	10.41	10.29	10.24	10.18
225.0	11.08	10.91	10.86	10.69	10.58	10.46	10.41	10.29	10.24
270.0	11.25	11.14	10.97	10.86	10.74	10.63	10.52	10.41	10.35
315.0	11.25	11.08	10.97	10.86	10.69	10.58	10.52	10.41	10.29
360.0	11.42	11.25	11.08	10.97	10.80	10.69	10.63	10.52	10.41
C/γ(°)	63.0	64.0	65.0	66.0	67.0	68.0	69.0	70.0	71.0
0.0	10.29	10.29	10.24	10.13	10.07	10.01	9.96	9.96	9.90
45.0	10.13	10.07	10.01	9.96	9.90	9.84	9.84	9.84	9.79
90.0	10.07	10.01	9.96	9.90	9.84	9.84	9.79	9.79	9.73
135.0	10.13	10.07	10.01	10.01	9.96	9.84	9.84	9.84	9.79
180.0	10.13	10.07	9.96	9.96	9.90	9.84	9.84	9.84	9.79
225.0	10.18	10.07	10.01	10.01	9.96	9.90	9.84	9.79	9.79
270.0	10.29	10.24	10.13	10.07	10.07	9.96	9.96	9.90	9.84
315.0	10.24	10.18	10.13	10.07	10.01	10.01	9.90	9.90	9.84
360.0	10.29	10.29	10.24	10.13	10.07	10.01	9.96	9.96	9.90
C/γ(°)	72.0	73.0	74.0	75.0	76.0	77.0	78.0	79.0	80.0
0.0	9.84	9.84	9.84	9.79	9.79	9.73	9.73	9.73	9.73
45.0	9.79	9.79	9.73	9.73	9.68	9.68	9.68	9.68	9.62
90.0	9.73	9.73	9.73	9.68	9.68	9.62	9.62	9.62	9.62
135.0	9.79	9.79	9.73	9.73	9.73	9.68	9.68	9.62	9.62
180.0	9.79	9.73	9.73	9.68	9.68	9.68	9.68	9.68	9.62
225.0	9.73	9.73	9.73	9.73	9.73	9.68	9.68	9.62	9.62
270.0	9.84	9.84	9.79	9.73	9.73	9.73	9.73	9.73	9.68
315.0	9.79	9.79	9.79	9.79	9.79	9.79	9.73	9.73	9.68
360.0	9.84	9.84	9.84	9.79	9.79	9.73	9.73	9.73	9.73
C/γ(°)	81.0	82.0	83.0	84.0	85.0	86.0	87.0	88.0	89.0
0.0	9.68	9.68	9.68	9.68	9.62	9.62	9.62	9.62	9.56
45.0	9.62	9.62	9.62	9.62	9.56	9.56	9.56	9.51	9.51
90.0	9.62	9.62	9.62	9.62	9.68	9.51	9.51	9.51	9.56
135.0	9.62	9.62	9.62	9.56	9.56	9.56	9.56	9.56	9.51
180.0	9.62	9.62	9.62	9.62	9.62	9.56	9.56	9.56	9.56
225.0	9.62	9.62	9.62	9.62	9.68	9.73	9.68	9.56	9.51
270.0	9.68	9.68	9.68	9.68	9.68	9.68	9.68	9.56	9.56
315.0	9.68	9.68	9.68	9.62	9.68	9.68	9.62	9.62	9.56
360.0	9.68	9.68	9.68	9.68	9.62	9.62	9.62	9.62	9.56

Intensity data(cd)

C/γ(°)	90.0
0.0	9.56
45.0	9.51
90.0	9.51
135.0	9.56
180.0	9.56
225.0	9.51
270.0	9.56
315.0	9.56
360.0	9.56